general aviation

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NEWS
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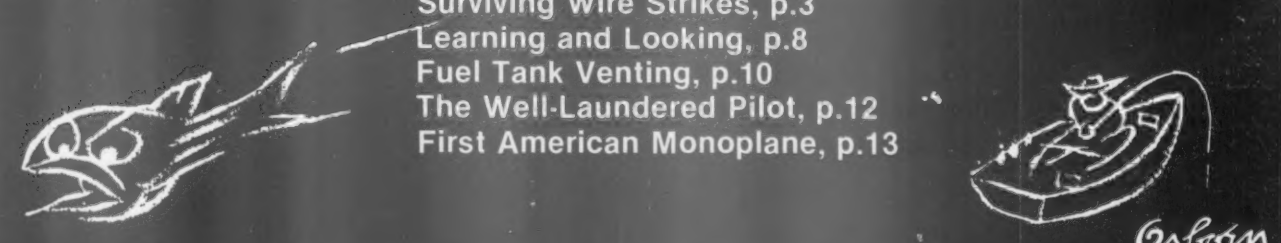
FRESH WATER FLYING, p.4

Also:

Surviving Wire Strikes, p.3
Learning and Looking, p.8
Fuel Tank Venting, p.10
The Well-Laundered Pilot, p.12
First American Monoplane, p.13



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BRIEFS

VIOLATED AIRSPACE. FAA's general aviation district office in San Diego, CA reports numerous incidents of itinerant pilots entering military airspace and landing without permission at Miramar NAS. Actually the pilots were headed for Montgomery Field four miles to the south. When entering the area from the north and east, Miramar stands out and many pilots assume it is Montgomery, although the military runway is some 8,500' longer than the civilian. FAA inspectors suggest pilots back up their pilotage with VOR navigation. VFR pilots bound for airports near military fields may also ask local approach control facilities for assistance.

IDLE AIRCRAFT. The pilot had not flown his aircraft for so long that the plane was half-hidden by weeds and tall grass. Undaunted, he pushed it into shorter grass and tried to start. It took an hour of handpropping to coax a cough from the engine and the pilot took off after a short run-up. Onlookers kept their fingers crossed. Dis-use can lead to a multitude of problems. If rising operating costs have curtailed your flying, we suggest you review manufacturer recommendations for procedures to return an aircraft to service after extended storage or refer to FAA Advisory Circular 20-106, "Aircraft Inspection for the General Aviation Aircraft Owner."

BURNING BUSH. Heat from red-hot helicopter exhaust pipes can—and has—set fires after a landing. In a recent accident in Australia, a pilot landed a Hughes 296C in tall, dry grass to drop off a passenger. The pilot was aware of the danger of igniting the dry foilage but intended to lift off immediately after the passenger was clear. The passenger opened the cockpit door to disembark and was confronted with a wall of flame. Both men then beat a hasty retreat and watched as the helicopter soon was reduced to a mound of slag. If operating frequently near areas of dry grass, contact the aircraft manufacturer about the possibility of installing a heat shield or pick another place to land.

DISPLACED AIR. Aviation users of dry ice (**solid** CO_2) for transporting perishables or for keeping the family picnic fresh in flight should be aware that as dry ice is exposed to air, it releases CO_2 gas. In the closed confines of an aircraft this could mean hypoxia at altitudes where it is not normally experienced. If enough gas displaces breathable air, asphyxiation can occur. At the first symptoms (headache, dizziness, shortness of breath, weakness in arms and legs, drowsiness, ringing in the ears) use oxygen if you have it or ventilate the cabin by opening fresh air vents or windows. Land as soon as possible.

Surviving Wire Strikes

Advice from an ag pilot who knows his lines

The more time one spends in flight beneath pole height in close proximity to wires, cables, and lines the greater his chance of sooner or later making contact with one of these objects, regardless of his skill or experience level. His actions during the first seconds after this unfortunate event can make the difference between a front page story in the next day's paper, or a routine notation in the log of a wire repair crew.

After striking a wire, the first action a pilot must take is the immediate addition of maximum power while he still has flying speed and control of the aircraft. There is always the possibility that he may be carrying hundreds of feet of copper or steel line streaming out and down behind the aircraft, and immediate full power could mean the difference between continued flight or loss of airspeed and an unmanageable descent. Never hesitate to dump all or a portion of your load as necessary to maintain flight, except in the case of dusting sulfur, where the fire hazard associated with this substance will make it preferable to retain it in the aircraft.

If the pilot is clear of other wires ahead, and able to gain altitude, he should by all means climb, *as increased height lessens the chances of the attached wire dragging over other lines, thus shorting them out and possibly adding their drag to the burden already being carried.*

Upon reaching a safe altitude, the pilot should level and stablize the airplane, inspect all surfaces visible from the cockpit, and check its flying characteristics with a view towards landing as soon as practicable. If he is indeed carrying a length of wire, he must plan his approach and touchdown with this factor very much in mind. He should also survey the site of the strike for possible injuries to flaggers or other ground personnel, and check the area for fires which may have been started by the broken line.

The above remarks are by Jim Snyder, a veteran California agricultural pilot with more than 20 years of experience in low level flying and a close acquaintanceship with many types of wire obstructions. His comments are meaningful not only to his fellow ag flyers but to all types of general aviation pilots. Although ag pilots work in constant proximity to the wires, they account for only a small proportion of wire strike accidents.

In 1980, for example, the National Transportation Safety Board reported 179 wire accidents, of which 36 involved agricultural aircraft. The fatalities (4) and serious injury rate for these 36 accidents were relatively low, compared with other types of wire strike accidents. The reason is not hard to find, considering that ag planes (those built for this purpose) have a very protective cabin structure, usually contain only one occupant, and are flown at low speeds close to the ground, and in almost constant view of high voltage lines. They are also frequently equipped with wire breakers, cutters or deflectors; roll-bar cockpits, crashworthy seats; and four or five point safety harnesses. The pilot often wears a crash helmet. And he usually has a large-volume, energy-absorbing hopper ahead of him to lessen the shock of ground impact. Finally, the possibility of a wire strike is always in his mind.

The great majority of wire strikes occur to pilots engaged in all manner of general aviation flying, including considerable legitimate low-flying such as forest or pipeline patrol, aerial photography and mapping, search and rescue, etc.. "Illegitimate" low-level flying, such as buzzing, or flying close to a river surface of canyon floor, also claims many victims. But the largest segment of all is simply made up of pilots who are conducting an approach to land and are handicapped by such factors as power loss, poor visibility or unfamiliarity with the area. Wires are not usually shown on charts. They are extremely hard to see with the naked eye, unless you know where to look or can spot their poles—not always visible behind summer foliage.

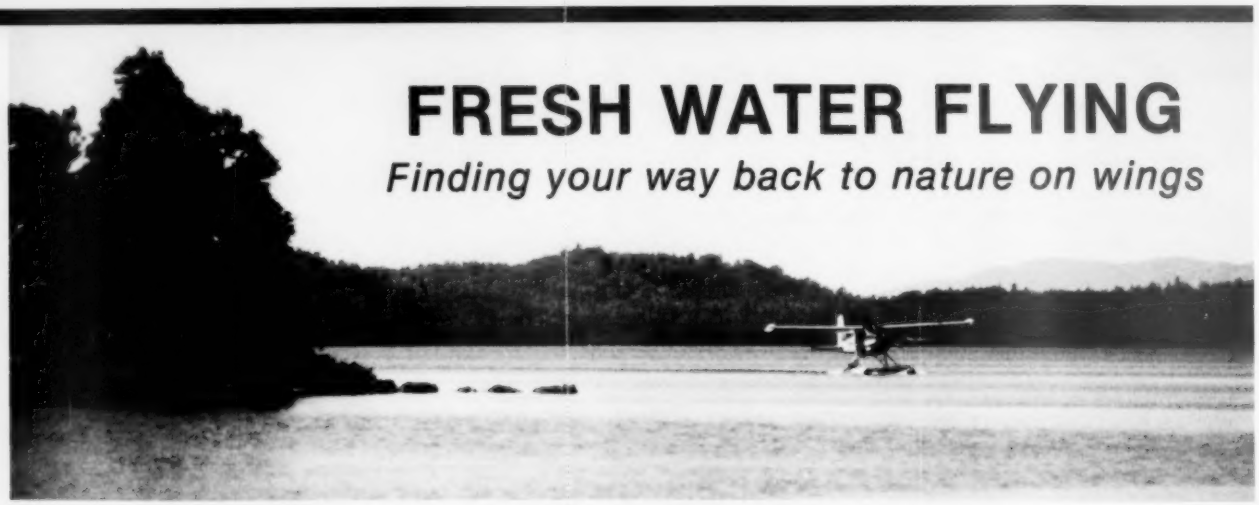
In all wire strikes, the element of surprise plays an important role. The pilot usually never does actually see the wire; there is only a sudden, violent arresting of his forward motion, or possibly the aircraft is pitched over or flipped around. Because of his proximity to the ground he has only a few seconds in which to understand his situation and take appropriate action.

Wire-savvy pilots like Snyder caution against the instinctive tendency to descend and land immediately after experiencing a wire strike. An "instant landing" may be possible for the ag pilot who is rarely more than a few yards above the ground and has open fields around him; but other pilots are apt to be descending toward an airport which offers the only clear area for miles in any direction. If the aircraft is damaged and unable to fly, there is no alternative but to descend. However, often the initial damage is minimal—except to the pilot's nerves.

The least damage is usually done when one or two light low-voltage lines are encountered by the propeller, which may cut its way through them with scarcely a slowdown in rpm. A thick high-voltage line, or a network of many lines, on the other hand, is likely to stop or break a prop, calling for immediate engine shutdown. Wires encountered by blunt edges of the aircraft, such as wing or gear struts, or wing or tail surfaces, may not be cut through at the point of impact but may become entangled with the plane and torn away from their crossbar attachments. In some cases portions of the crossbar have remained with the trailing wire, causing serious problems of control and balance, and sometimes becoming lodged in trees or fences during the attempt to land. Hence the importance of evaluating the post-strike situation when conditions permit, as opposed to an immediate descent.

The presence of wires strung around airports or over scenic terrain where pilots are tempted to engage in low level flying is a never-ending source of concern. Progress in getting wires marked in known areas of flight activity has been made in many states where pilot groups have made their feelings known, but the hazard is not likely to go away. For the most part, like the ag pilots, we must learn how to live with the lines. ■

Editor's note: "Surviving Wire Strikes" was based in part on an article written by J.J. Snyder for On the Deck, *official publication of the California Aviation Agricultural Association, and quoted with permission.*



FRESH WATER FLYING

Finding your way back to nature on wings

The simple act of exchanging wheels for a pair of floats give you access to a kind of aerial adventure that is virtually unknown to land-plane pilots: fresh water flying. There are thousands of attractive lakes in this country, located in nearly every state. Some of the most interesting bodies of water are in the northern and mountainous states, and in Canada, far away from land airports or even usable open terrain but reachable by seaplane.

Active seaplanes registered in the United States number an estimated 5,000. The figure is necessarily approximate because the fleet includes not only hull-type seaplanes ("flying boats") and amphibians but also wheel aircraft which are float-equipped for part or all of their operations. The number of pilots with seaplane ratings is also a *guess-timate*, since FAA does not tally these ratings. The Seaplane Pilot Association believes the figures to be in excess of 30,000.

The most popular aircraft for this purpose currently are light single-engine planes using straight or amphibious floats. A pilot with a single-engine land certificate can obtain his seaplane rating with as little as two days of training.

Quite a bit more effort, however, is required to become a safe, competent modern-day weekend "bush" pilot. Except for the very far north, the available bodies of water are no longer the exclusive domain of the airman. Improved roads and off-the-road vehicles, coupled with a widespread back-to-nature movement, have brought more and more vacationers and their assorted paraphernalia to once wild rivers and isolated lakes. The natural hazards of the backwoods, such as grizzlies or wolves or lake monsters, have given way to modern man-made hazards to aviation, such as electric powerlines, power, sail and row boats, rafts and mooring lines, waterskiers, swimmers, etc.

Contemporary floatplane flying demands a constant vigilance for the presence of these often difficult-to-see obstacles to flight, as well as a thorough grounding in right of way rules as they apply to aircraft versus boats. Part 91.69 of the Federal Aviation Regulations states that aircraft on the water "...shall, insofar as possible, keep clear of all vessels and avoid impeding their navigation...." In general, while on the surface with the engine running (idling or otherwise) an aircraft is treated like any other vessel by the right of way rules, and must give way to all nonpowered vessels.

Once a floatplane has landed on the water, it is considered a boat, and nautical rules as well as FARs apply. Floatplane pilots are expected to know and adhere to both Inland Navigation Rules (Public Law 96-951) and FAR 91.69—Right of Way Rules; Water Operations. There are some unwritten right-of-way rules also. Since a floatplane in the water is not as maneuverable as one in the air, the aircraft on the water has right of way over one in the air, and one taking off has right of way over one landing.

Regulations notwithstanding, most veteran floatplane pilots know that the movements of boaters can be very unpredictable. Their occupants can appear totally disinterested in the intentions of an aircraft pilot, especially if the boater is engaged in a competitive race, or towing a brace of acrobatic skiers, or is in pursuit of some mighty finned specimen lurking beneath the surface. The landing or departing pilots' need for an unobstructed stretch of water, free from human activity and powerboat wakes, is not always appreciated. Unless an emergency exists, the pilot simply has to exercise patience and bide his time watching for the opportune moment. Even then, while flying the airplane, in addition to scanning the water surface, head carefully he has to keep a watch for small boats darting out from hidden coves or tree-overhung shores.

A newcomer to floatplane flying was practicing touch and go landings on 40 mile long Lake Travis, near Austin, TX on a hot summer day when he got his first lesson on the subject of avoiding water traffic. The pilot had selected an open stretch of water at the north end of the lake for his operation in a float-equipped Cessna 172. He completed three successive touch-and-goes without incident, using a right-hand pattern in order to gain a clear view of the shoreline activity along nearby Calcasieu Point. The only traffic observed, during the third approach, was a powerboat headed away from the Point in a southerly direction, which appeared to offer no conflict.

After the third landing, the pilot was applying power for another takeoff when he felt a sharp jolt. He immediately shut the engine down. In coasting to a stop, the Cessna veered to the right slightly, affording the shaken pilot a view of the 19 foot long low-slung "skiboat" he had just collided with. It was not the boat he had seen earlier; in fact he had not seen it at all during his operations in the pattern circuit.

FAR 91.69 RIGHT OF WAY RULES; WATER OPERATIONS

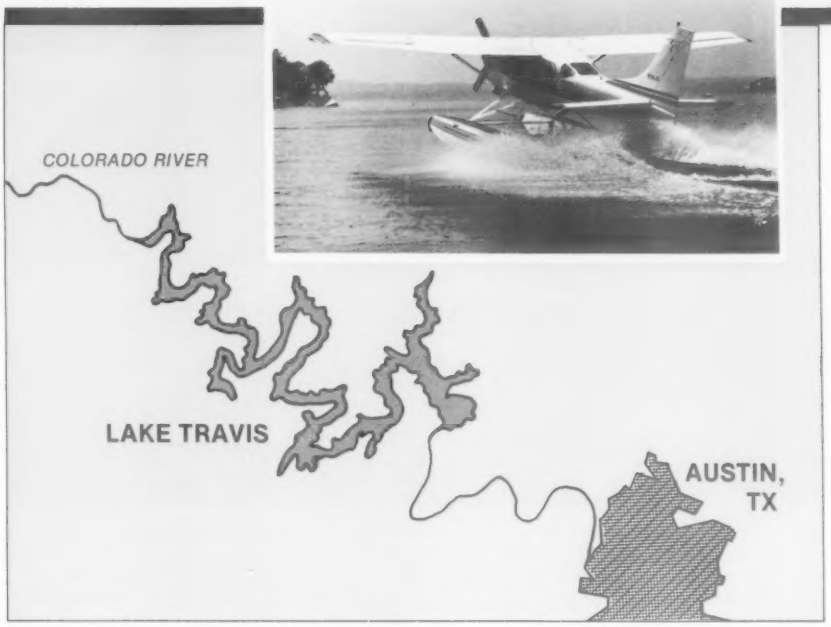
"(a) *General.* Each person operating an aircraft on the water shall...keep clear of all vessels and avoid impeding their navigation, and shall give way to any vessel or other aircraft that is given the right of way by any rule of this section.

"(b) *Crossing.* When aircraft, or an aircraft and a vessel are on crossing courses, the aircraft or vessel to the other's right has the right of way.

"(c) *Approaching head-on.* When aircraft or an aircraft and a vessel are approaching head-on or nearly so, each shall alter its course to the right to keep well clear.

"(d) *Overtaking.* Each aircraft or vessel that is being overtaken has the right of way, and the one overtaking shall alter course to keep well clear.

"(e) *Special circumstances.* When aircraft, or an aircraft and a vessel, approach so as to involve risk of collision, each aircraft or vessel shall proceed with careful regard to existing circumstances, including the limitations of the respective craft."



Judging from the damage—right horizontal stabilizer bent downwards on the aircraft and scratches on the left bow of the boat—the boat had struck the moving aircraft from the right rear at about a 45° angle. From the extent of the damage and the position of the boat, investigators for the National Transportion Safety Board concluded that only at the last minute the boater seen the airplane and decelerated—and that he had not taken any evasive action. The boat's skipper and passengers confirmed later to investigators that they had not seen the Cessna until just before the collision. Investigators were unable to establish the exact origin of the boat prior to impact but concluded it had emerged from one of the several coves in the area. The Safety Board determined that all involved—the pilot and the boat operator—were at fault.

Weekend temperatures in the 90's can bring a lot of bodies to a lake, and boats as well, especially when marinas are available. Sudden, unpredictable boat movements are usually the order of the day. To pilots it would seem obvious that if an aircraft circles low over a lake and then descends on a straight ahead course at reduced speed, that plane is going to land, and its run-out area should be given a wide berth. But boaters, evidently, do not think like pilots, and may skitter around the landing plane's flight path with reckless abandon, giving no thought to the possibility that the pilot may experience problems and need additional maneuvering room. Hence the safety advantages of landing in open, unobstructed stretches of water.

Lake Winnepesaukee, for example, in central New Hampshire is a large lake encompassing some 230 square miles, with an oblong shape extending southeast to northwest, nearly ten miles across at its widest point. On a very hot day in July, a private pilot from Poughkeepsie, NY decided to fly up to the lake in his *Buccaneer* (Lake 4-200), a four-place, hull-type amphibian with a pylon-mounted engine. The pilot, who had about 300 total time, was accompanied by his wife and two children. On arrival, at approximately 3:00 p.m., with temperatures and water activity at their peak, he elected to land on Meridith Neck, a narrow inlet at the north end of the lake where a marina was situated.

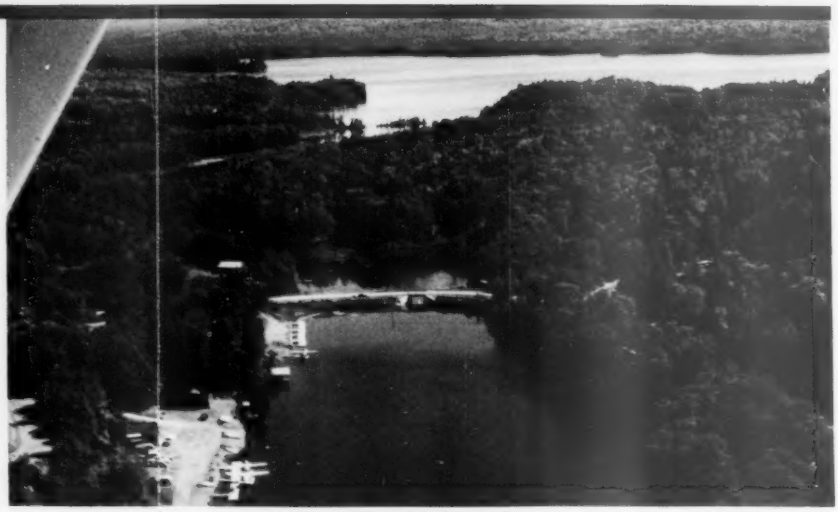
Landing to the north, he planned to touch down at least 1,000 feet south of the marina, located on the west shore. There was no boat traffic visible in the narrows to the pilot as he flared to land.

However he did observe that the water was heavily churned up by boat wakes and from the wind, which was blowing from the west and gusting to 30 knots. At touchdown, about 300 yards out from the shore, the aircraft bounced strongly off the water and remained airborne as the pilot felt what seemed to be a quartering wind pushing him forward. He decided to abort the landing and applied full power, but after climbing to only about 25 feet above the lake the *Buccaneer* started to settle back down to the water.

The pilot then decided to continue the landing and reduced power. By this time he was close to a small island ahead, and was obliged to initiate a right turn to avoid it. While in the turn his right wing float impacted the water and the wingtip unexpectedly struck a boat. According to witnesses' statements in the National Transportation Safety Board's report, this was a 15 foot powerboat which had just left the dock and, headed directly across the aircraft's intended landing path. The *Buccaneer* went out of control and cartwheeled over the boat, but landed upright in the water after reversing direction.

The boat was substantially damaged and the three persons on board were injured, one seriously as a result of having been struck by the wing. There were only minor injuries to the occupants of the aircraft, but the hull was broken and the aircraft was towed to shore in order to prevent it from sinking. The Safety Board determined that improper landing technique on the part of the pilot was responsible for the accident.

At many lakes and rivers—especially those with a long history of aquatic usage by local residents and annual summer people—there is a tendency for non-airmen to regard visiting



Veteran seaplane pilots land in open water of Shin Pond, ME and taxi into narrow inlet.

aircraft as interlopers polluting their peace and quiet and endangering their recreational play. This may be one reason why they often seem unwilling to accommodate the needs of an airplane preparing to land. But navigable bodies of water are under the jurisdiction of the state, unless they are under Federal jurisdiction, or in a few cases privately owned. And unless they are officially restricted, aircraft have as much right to use lakes and rivers as anyone else. The state aviation authority will have complete information on this subject.

Federally controlled bodies of water are another matter, especially those lying in an area where the preservation of natural conditions is a prime concern and motorized vehicles are restricted. In Wilderness Areas or National Parks landing an aircraft is generally prohibited, except where a long history of such usage induces the governing agency to allow its continuance—usually on a restricted basis. Lakes in National Forests *outside* of Wilderness Areas are more generally accessible, although there may be certain local restrictions which you should know about.

If you land on a forbidden body of water because of an inflight emergency, or in ignorance of the restrictions you have violated, report as quickly as practical to the nearest local official having jurisdiction and explain your presence. It is unlikely that you will not be allowed to fly the airplane out. You may be fined, but if a first-time offense you may only be cautioned and asked to make your departure in a manner least likely to damage sensitive environment. Alpine lakes, for example, are almost universally prohibited to aircraft because of the delicate balance of nature upon which their existence depends.

TABLE I

AUTHORITY TO CONSULT FOR USE OF A BODY OF WATER

Location	Authority
Wilderness Area	U.S. Department of Agriculture, Forest Service; contact local forest ranger
National Forest	USDA Forest Service; contact local forest ranger
National Park	U.S. Department of the Interior, National Park Service; contact local park ranger
Indian Reservation	USDI, Bureau of Indian Affairs; contact local Bureau office
State Park	State government or state forestry or park service; contact local state aviation office for further information
Canadian National and Provincial Parks	Supervised and restricted on an individual basis from province to province and by different departments of the Canadian government; consult Canadian *Flight Information Manual** and/or *Water Aerodrome Supplement**; contact park superintendent in an emergency

*The Canadian *Flight Information Manual* is available from Canadian Government Publishing Centre, Supply and Services Canada, Ottawa, Ontario, Canada K1A 0S9 for $7.25 in Canada, $8.70 all other countries. *The Water Aerodrome Supplement* may be purchased for $3.50 per copy plus $.50 for handling. To order or obtain subscription information, contact Canada Map Office, Department of Energy, Mines and Resources, 615 Booth Street, Ottawa, Ontario, Canada K1A 0E9. Prices subject to change without notice.

The trick to avoiding trouble with local citizens or Federal officials is to check out the destination area in advance. In addition to the agencies listed in Table I, the nearest FAA Flight Standards District Office can usually offer some practical suggestions as well as regulatory information.

Legal access rights notwithstanding, there is no point in making yourself or your airplane a source of irritation to people on the ground; a little common sense is all the guide you need in this matter. If you have to practice landings, do not choose a quiet cove lined with beach houses on a quiet Sunday morning. If there are yacht races taking place, ascertain the course and stay well away from it. Taxi slow enough to avoid swamping rowboats or canoes. Do not make low passes over the beach to gawk at sunbathers. In other words, be a good neighbor, and the chances are you will be accepted as such. If you really want to win some hearts, take up some of the local children for a free spin around the lake—but make sure you get their parents permission, in writing.

If by dint of wise planning you are able to find the ideal isolated primeval lake in the woods for your water flying adventure, take a little time also to make certain that you will not be stranded there out of touch with the world for longer than you desire. Floatplane pilots, who can land almost anywhere in areas abounding in water, tend to be more adventurous than pilots whose flights are necessarily restricted to areas with suitable landing fields. The trouble with adventuring at random in an airplane in sparsely settled country is that if you have trouble with the aircraft and go down unexpectedly, all the search planes that are available may not be able to find you in time. Lakes are usually in low areas, often surrounded by heavy woods and steep mountains, so take the trouble to report in by radio before you descend out of range—even if you are only going down to look the area over for a possible landing.

The farther afield you go, the more importance you should attach to your survival gear. Minimum kits are recommended summer and

TABLE II
Survival Gear

Equipment	Required in Canada	Alaska*
Food	5 lbs. per person	2 weeks worth per person
Cooking utensils	+	-
Stove and fuel	+	-
Matches	+	+
Axe or hatchet	+	+
Flexible saw blade	+	-
Pocket compass	+	-
Knife	+	+
Fishing equipment	+	+
Mosquito netting	+	+
Insect Repellent	+	-
Sleeping bags for each person	+	+ (also a wool blanket for each)
Tents or engine/wing covers	+	-
Snowshoes	2 pair	1 pair
Flares	3	2 signalling devices in sealed metal container
Signalling mirror	+	-
Survival manual	+	-
First aid kit	-	+
Firearm with appropriate ammo	handgun not allowed in Canada	+

+ required - not required

*Required by state law only for aircraft flying in and into Alaska. Enforced by local authorities and recommended by FAA.

winter, and are required by law for flights into sparsely settled areas of Canada (nine-tenths of the country) and Alaska (See Table II). Your kit should be assembled in one container and easily reachable (preferable flotable, also) in case your plane strikes a submerged log on landing and capsizes. Even when flying to lake country it is a good idea to bring along some potable water, just in case you land short of your destination or find the local water contaminated. If weight is critical, substitute purifying tablets.

If you find on arrival, as occasionally happens, that the faraway lake of your choice has shrunk or dried up during a drought, to the extent that a normal landing on water is not possible, and your fuel is running low, that is not a reason for panic. Float equipped planes have been landed on marshy ground, on grass, and even on dry ground by experienced pilots, and sometimes taken off again. This is possible in part because most floats are designed to be aerodynamically clean. This reduces friction as well as drag to a minimum, and also generate some lift, which results in a slower stall and landing speed for the same aircraft when using wheels only.

Out in the wilderness you are not likely to find docks or mooring lines, or tiedowns of any kind unless they have been brought along, and a sudden summer storm could turn you into a hermit overnight if you have not protected your aircraft from the elements.

Lightweight temporary tiedown anchors, which resemble overgrown corkscrews, can be transported in the aircraft. If you can beach safely on a shore that is not too heavily rock-ribbed or too loosely sand rimmed, these anchors can be screwed into the ground securely—one for each wing and one for the tail. Flooding the floats also helps ballast the plane, but make sure you have a bilge pump for clearing them later. Boat anchors will also serve to moor a seaplane on water, but they would have to be sizeable, since wind pressure is many times more severe in an airplane. Anchors would mean a severe reduction in useful load.

On the water an anchored plane will weathervane into the wind, which may wander all around the compass, so make certain there is enough clear area when you set your anchor and mooring line.

Some pilots carry several hundred feet of lightweight nylon rope, and moor their plane to one or more trees on shore. If strong winds are expected, you may have to destroy some of the lift-generating capability of the wing in order to prevent the plane from capsizing. This is not as drastic a procedure as it sounds. One "home-made" solution that can be carried easily are spoilerboards, lightweight 2 x 2's cut to the length of the wing and lined with foam rubber on one side to keep them from damaging aircraft skin. Holes are drilled through the board's width so that it can be held in place on top of the wing by tie down ropes.

If caught without any liftspoiling devices, a pilot will have to make do as best as he can by securing the controls. Water rudders should be pulled up, to help the craft weathervane. The yoke should be tied full *forward*, and the CG should be shifted as far forward as possible—accomplished by moving as many occupants and cargo as far forward as possible. (In rough water the rear of the floats tends to go under, and take in water through the inspection holes.) Lock all controls with internal or external gust locks. This battening down can be a lot of work in preparation for a blow that may never materialize, but it is much harder work trying to fly out without an airplane. ■

Valuable assistance for this article was provided by the Seaplane Pilots Association and its publications editor, Mary Silitch; also J.J. Frey, Jr., Vice President of EDO Corp.

Cessna Stationair on remote Canadian lake moored to onshore trees by nylon ropes. Experienced wilderness flyers suggest a 1,000' or more of rope and plenty of slack when tying up.

Learning and Looking

The importance of continuous scanning while taking or giving flight instruction

On the morning of June 27, 1980, a clear day when you could see just about forever from the granite bluffs around Prescott, AZ, three aircraft were reported in the pattern at nearby Love Field (uncontrolled). One of the aircraft, a Cessna 172 ***Skyhawk,*** *took off from runway 03 and at an altitude of about 800 feet AGL began a climbing turn to the left. A second airplane, also a* ***Skyhawk,*** *approached the field from an easterly direction and made a crosswind entry to the pattern at approximately 1,000 feet AGL. There were two pilots in each airplane, yet no one saw anything in time to prevent a midair collision. The impact tore away the left horizontal stabilizer and elevator of the approaching 172, while the other airplane received damage to the engine area, including bent engine mounts, deformed cowling, broken air cooler and exhaust manifold.*

Surprisingly—one might even say miraculously—both aircraft were landed "normally," albeit on different runways, and there were no injuries.

This could be a tribute to the skill of the pilots-in-command, who were both flight instructors, but it also raises the question as to whether they had been absorbed in giving flight instruction, prior to the accident, to the extent that they failed to carry out their responsibilities for seeing and avoiding other aircraft.

Following an investigation, the National Transportation Safety Board concluded that both pilots-in-command had "failed to see and avoid." FAA's Western-Pacific Regional Counsel imposed a 120-day certificate suspension on the pilot of the departing Cessna for operating an aircraft "...in such close proximity as to create a collision."

Is there any evidence that inflight instruction increases the likelihood of an accident taking place? On an overall basis, no. Dual instruction accounts for an estimated seven to ten percent of all general aviation flying, yet this type of flying is associated with less that five percent of overall accidents.

However, if you focus attention on midair collisions only, you find that on the average dual instruction, as a type of flying, is linked to approximately *20 percent of the accidents.* In 1980, for example, the latest year for which we have complete National Transportation Safety Board figures, seven of the 24 midairs reported (29 percent) involved at least one certificated instructor who was engaged in giving instruction at the time of the accident.

Learning to scan for other aircraft is an art which the instructor is continually teaching, and as all instructors know it is an art which can only be learned by doing. At the same time the instructor has a responsibility for ensuring that proper separation is maintained from other aircraft regardless of what the student or trainee is doing. The student's eagerness to learn, plus his confidence in his instructor's alert eyes, may lead to periods of interrupted scanning.

Similarly, a review of the instructional midairs suggests that in their zeal to teach effectively some instructors occasionally overlook certain safety factors:

• **Position reports.** Attending to and giving out position reports on the radio while operating at a non-controlled airport (as recommended by the Airman's Information Manual and detailed in FAA Advisory Circular 90-42B), is a chore that some instructors disregard in some phases of training. They feel perfectly confident in the environment where they teach, and they dislike being interrupted with what often seems like excessive radio chatter. Or they believe the radio reports are making the student nervous and inattentive. Some instructors feel that learning to handle the aircraft is enough to concern the student with in his early phase of training. All this may be true, but shutting off the radio is not the only alternative, and may be a potentially hazardous act. Usually another teaching environment or another time of day or week can be selected, if the lesson is not going well at the present site because of traffic density.

North Central State is a small uncontrolled airport in the northern hills of Rhode Island, near the Massachusetts border. There are two intersecting runways, the longest (5,000') being 05/23. In the late afternoon of May 2, 1980, a Piper *Tomahawk* (low-wing trainer) was in the pattern practicing touch-and-go landings. The recently certificated pilot, flying alone, broadcast his position in the blind on the UNICOM frequency (122.7) as he prepared to turn on each leg. There was no response, and he saw no other aircraft in the pattern.

At 4:00 p.m. as he was flaring to land on runway 05, at a point approximately 200 feet beyond the threshold he was abruptly involved in a collision with another aircraft, also a *Tomahawk*, engaged in dual instruction. The fuselage of the instruction aircraft was severed just forward of the tail section by a propeller blade; the aircraft rolled over and crashed on the runway in an inverted position. Both occupants, the instructor and a student taking only his second lesson, were seriously injured, but survived. The other aircraft, lightly damaged, was able to land safely.

Statements by investigators and witnesses, as reported by the Safety Board, disclosed that the instruction aircraft did not have a radio microphone on board at the time of the accident, and that the receiver switch was in the "off" position. The assistant chief flight instructor of the flight school further stated he was aware that this instructor "...was not teaching his students to use the radio in the aircraft. We had talked about this and agreed that radio communication is necessary to fly in and out of uncontrolled and controlled airports, that we teach radio procedures from Lesson 1 on, not 10-15 hours later in the student's training." He added, "I just feel that there was no radio watch being maintained and it brings home the point of using every available aid in the aircraft and instructing the student in its proper use."

• **Weather.** Some instructors are not troubled about teaching in marginal VFR weather. They reason that exposing the student to various kinds of conditions is good training. The argument makes sense, but it does not cancel out the fact that poor weather usually means reduced visibility and calls for greater than usual vigilance in scanning for other aircraft. If lowered ceilings are present, the amount of usable airspace for training may be compressed, and therefore the traffic will be more dense. Such conditions were present at the site of a midair collision near Miami on July 2, 1980, which cost the lives of four persons.

The two aircraft involved, both Cessna 152 trainers, were from the same flight school in Opa Locka, FL. The first departed the airport at 11:29, the second at 11:40 a.m. Each had two occupants, an instructor and primary student, and both headed for Alert Area No. A-291A. This is a designated practice area about 15 miles northwest of Fort Lauderdale,

approximately 300 square miles, extending from the ground up to 2,500 feet. Used heavily by flight schools and flying clubs in southeastern Florida, A-291A underlies very busy Miami air carrier routes. The terrain is flat and marshy, intersected with canals.

Shortly before noon witnesses on the ground heard a loud noise and saw two aircraft falling in different directions. There were no survivors.

The accident report filed by the Safety Board found no evidence of mechanical malfunction or of pilot incapacitation. The aircraft and the airmen were properly certificated.

Analysis of the wreckage indicated that the two aircraft had been approaching each other at an angle of about 45° at approximately the same speed and altitude. The left wing of one airplane struck the windshield, the propeller and the left wing strut of the other while the latter was in a shallow right turn. Wreckage was scattered over a wide area.

Mechanical failure or pilot incapacitation were ruled out as accident causes by investigators. Of possible significance, however, is the weather observation taken at Fort Lauderdale at 11:47 a.m. which included the following: *2,000' scattered, 20,000' broken, visibility 8 miles, large CB (cumulonimbus cloud) moving northwest.* Evidently the clouds moved in over the practice area, because the special weather observation taken immediately after the accident reported *indefinite ceiling, sky obscured, visibility ¼ mile in thunderstorm...*

No doubt either instructor could have handled the weather conditions safely on his own. But attempting to carry out primary flight instruction in weather that is no longer VFR or at best marginally so is another matter. Teaching students the value of avoiding bad weather by staying on the ground could be at least as important as getting them used to coping with it.

Another tragic accident that apparently involved weather took place near Bridgeport, TX, about 50 miles northwest of Dallas/Fort Worth Airport. On August 5, 1980 an F-27, transporting a popular country music band from Rapid City, SD, was preparing for an IFR approach to Dallas as it approached the Bridgeport VOR. The large twin turboprop had been cleared by Fort Worth Center to descend from 10,000 feet to 6,000 while tracking to Bridgeport VOR and outbound from the VOR on the 078° radial.

At approximately 12:36 p.m., according to the NTSB report, a Bridgeport Low Sector controller issued the F-27 pilot a traffic advisory: "VFR traffic at one o'clock, four miles, southeast bound, slow-moving, altitude unknown."

The F-27 pilot acknowledged, but was unable to locate the traffic. At this time the F-27 was descending slowly into a broken or scattered cloud layer. The pilot reported that "Tops of clouds were approximately 7,500 feet and bases about 6,000' MSL." He stated later that "the traffic pointed out would have been in or on the other side of the clouds. I was at no time actually in a cloud during my descent." He added, "Shortly after rolling out of my turn...I saw a flash or a shadow and at the same time I heard and felt a collision."

He notified the Center and asked for vectors to nearby Meacham Airport, reporting "severe control problems." In fact he had lost one-third of his vertical stabilizer, two-thirds of his rudder, all rudder and elevator trim, and the control linkage to the left engine was severed. Nevertheless he was able to calm his passengers, keep them safely belted in their seats, and land without incident.

Unfortunately it was another story for the other aircraft involved in the collision, a Cessna 172 with an instructor and student on board. The left wing of the 172 was torn away by the impact, and the aircraft crashed out of control, with no survivors.

There was no record of any radio contact (none was required) between the trainer and air traffic control, so that it is not possible to know exactly what took place during this flight. However, Safety Board investigators determined that the student was in a phase of instrument training that called for executing a holding pattern at the VOR with full or partial panel while under a hood. The airspace around Bridgeport VOR from the ground up to 5,000 feet is used for instrument training by at least eight flight schools in the area. The VOR is also an "entry gate" for Dallas-bound air carrier and other IFR traffic from the north and west. As many as 20-25 inbound flights per hour is not uncommon at noon.

Windshield damage from midair between two light trainers.

An acquaintance of the deceased instructor pilot provided the information that the latter's back was sore from flying in hot, rough air, and that "...he was going to fly high where the air was cool and smooth." Possibly that led to flight higher than the usual practice limits, and close enough to the clouds to interfere with adequate scanning for traffic. The Safety Board gave as the probable cause the failure of pilots in both planes to see and avoid other aircraft, and remarked that the leftside visibility of the 172 was restricted by the student pilot's instrument hood.

An instrument practice hood was found at the wreckage site and may have played some role in the visibility restriction, although it is not certain from the evidence that it was being worn at the time of the accident. Perhaps of more significance is the fact that air traffic control had no knowledge of the Cessna's intentions or altitude (a functioning transponder with altitude encoding capability would have provided a constant altitude readout to ATC).

Occurrence of accidents such as those discussed above should not allow anyone to lose sight of the fact that millions of hours of flight instruction are given annually in this country with an excellent overall safety record that is constantly improving. The number of accidents and fatalities is comparatively small, but it may be made smaller still if instructional dedication is always tempered with responsible concern for the unexpected. ■

1979 ACCIDENTS BY KIND OF FLYING

Total Accidents: 3,644*

	Accidents	Percent of Total
Instructional	477	13%
Dual (includes check rides and other training)	310	8.5%
Solo	167	4.5%
Non-Commercial	2,398	66%
Pleasure	1,961	54%
Business/Corp.-Exec.	294	8%
Other	143	4%
Commercial	553	15%
Agricultural flying	316	9%
Air taxi/commuter	190	5%
Other	47	1%
Miscellaneous	216	6%

*Small, fixed-wing aircraft only.

Fuel Tank Venting

An atmospheric fuel vent in an aircraft may be a complicated system of plumbing and valves, or it may simply be a small air hole in a fuel cap, not much bigger than a pinhole. But for lack of such a hole, lives and aircraft may be lost. Unless outside air is able to enter the tank as fuel is drawn out, the eventual result will be fuel gauge malfunction and/or fuel starvation, perhaps fuel tank rupture or even structural distortion of the wing.

For lack of a small air hole a young student pilot from the University of Virginia at Charlottesville lost power in his aircraft and narrowly escaped being involved in a tragic aircraft/automobile collision. Returning home one afternoon on a solo flight in a Cessna 150, he experienced complete power loss and for lack of open space attempted to land on Route 33, the highway near Ruckersville, VA. As he was just about to touch down on the road, an oncoming car appeared over the rise ahead. The airplane swerved off the road, struck a tree, and flipped over. Fortunately, it did not burn, and the pilot emerged with only a few cuts and a head bruise. Police arrived in time to cope with a massive traffic tie-up.

An investigation of the accident by the National Transportation Safety Board indicated the engine was fully operable. Fuel exhaustion was ruled out as an accident cause, since eight gallons of usable fuel were found in one tank. The fuel, however, was unable to flow to the engine because the vent line was stopped up by a wasp's nest, which created a partial vacuum in the tank. Since this was known to be a common cause of fuel starvation, FAA had issued an airworthiness directive in 1977 which required *vented* fuel caps to be installed as a fail-safe measure on all single-engine Cessna models, plus the twin-engine *Skymaster*.

The logbook of the student's rental plane indicated compliance with the AD, so it appeared that someone had inadvertently switched fuel tank caps with earlier non-vented caps. In any event, during the 150's last flight, when the primary vent to the right tank was blocked up, no other source of air venting was available, leading to fuel starvation once the left tank was used up. The absence of a small hole in the center of the cap might easily have been overlooked by anyone not familiar with the system or the AD.

Every airplane has at least one primary fuel tank vent. In light aircraft this commonly consists of small tubing leading from a point above the tank to a position under the wing where it will not be affected by reduced airflow pressure in flight. (This would produce incorrect readings in a fuel flow pressure gauge.) The tubing usually takes a sharp bend near the air intake, which is often situated behind a strut to prevent it from being blocked by ice or mud.

Occasionally in spite of the designer's best intentions the vents do become plugged with debris of this kind, but in the great majority of cases of vent failure the villainous agent is a small variety of wasp or hornet known as a *mud dauber*. This pesky little creature builds a nest of mud in the vent line that completely seals it off. When an aircraft takes off in this condition, unless air is able to enter the fuel system from auxiliary sources, fuel starvation is inevitable. The aircraft engine will function more or less normally in the early portion of the flight, when the tanks are full, or the engine is not fed from the affected tank. But eventually the engine will begin to run with an excessively lean mixture, then falter and fail, as the air pressure behind the fuel drops.

If the fuel tank is the rubber bladder type, it may shrink, and eventually rupture. If the tank is "wet" or "integral" with the wing, lack of venting may cause wrinkling or sagging of the wing surface, if the pressure differential developed by the engine fuel pump is strong enough to create a negative air pressure vacuum within the wing.

Unobserved damage to the venting system is also a hazard to flight. In a recent incident the pilot of a Beech A36 *Bonanza* was climbing out at 2,000′ MSL when he observed a sudden drop in fuel pressure. He was surprised because he had been monitoring fuel flow carefully during all stages of the flight and had calculated from published data and registered fuel flow that the tank contained at least 10 gallons. This belief was supported by the fuel contents gauge reading. However, engine failure occurred and the aircraft had to be landed in an open field, which was fortunately nearby.

Investigation established that the tank vent, which protrudes from the bottom of the wing, had been bent rearwards and therefore in flight created a negative air pressure in the tank. This caused the tank bladder to shrink and collapse, allowing some 10 gallons of fuel to escape through the vent. The fuel contents gauge reading was erroneous because the float arm movement was restricted by a crease which had formed in the bottom of the cell as it collapsed.

The vent on the *Bonanza* is a six millimeter tube which protrudes from the lower surface of the wing behind and inboard of the main landing gear. The A36 manual states that the tube must extend at least 45 millimeters below the wing surface and be canted 10 degrees forward of perpendicular to the skin. Any other configuration may create a negative vent pressure which will pull air and fuel out of the tank in flight.

A more serious emergency landing was averted by the knowledgeable pilot of a *Merlin III*, which developed a fuel system blockage problem while flying over the ocean to Hawaii. The twin turboprop was over 100 miles out to sea and cruising at FL 240 when a worried passenger came up to the pilot. She called his attention to the upper surface of the right wing, which was taking on a depressed and ribbed appearance. There was a moment of panic in the cabin as word spread of an imminent structural failure and the possibility of a ditching in the Pacific.

The pilot, after a brief consideration, concluded that there was a partial vacuum in the wing caused by venting blockage. He knew that the system contained a vent balance line designed to provide crossover venting from one tank to another in case of blockage, but evidently it was not functioning. He decided to open the crossfeed fuel valve, which allowed atmospheric pressure to push fuel from one tank to the other, reducing the negative air pressure. The wing surface slowly regained a near-normal appearance, and the pilot was able to proceed to the nearest airport and land without incident, despite a somewhat fuel-heavy right wing.

It was later discovered that a hornet's nest had been built in the right wingtank vent line at a point just before it is joined by the balance vent line—which explains why the latter was unable to relieve the blockage.

Another instance of wing damage from vent blocking was reported by the National Transportation Safety Board, concerning a Swearingen SA-266T, also a twin turboprop, while en route to Topeka from Chicago. Approximately 10 miles west of Topeka the pilot initiated his descent from cruise altitude of 16,000′. At 15,000′ he noted a distortion of the left wing, which appeared to be collapsing. In this case the pilot elected to make a speedy descent and

landing without attempting to relieve the condition in the wing. Once safely on the ground, he switched his fuel system to crossfeed, at which point some 400 lbs. of fuel made a quick transfer to the left fuel tank.

Investigators found deep, spanwise depressions in both the upper and lower wing surfaces, and metal fracture under the leading edge. There were a number of popped rivets and internal damage to several ribs.

Fuel for this aircraft is carried in a "wet-wing" system—i.e., the interior of a large portion of the wing cavity is sealed with the special sealant that allows the cavity to be used as a fuel cell. Both wings had recently undergone re-sealing for leaks, and apparently at this time some sealant material had plugged up the left vent line.

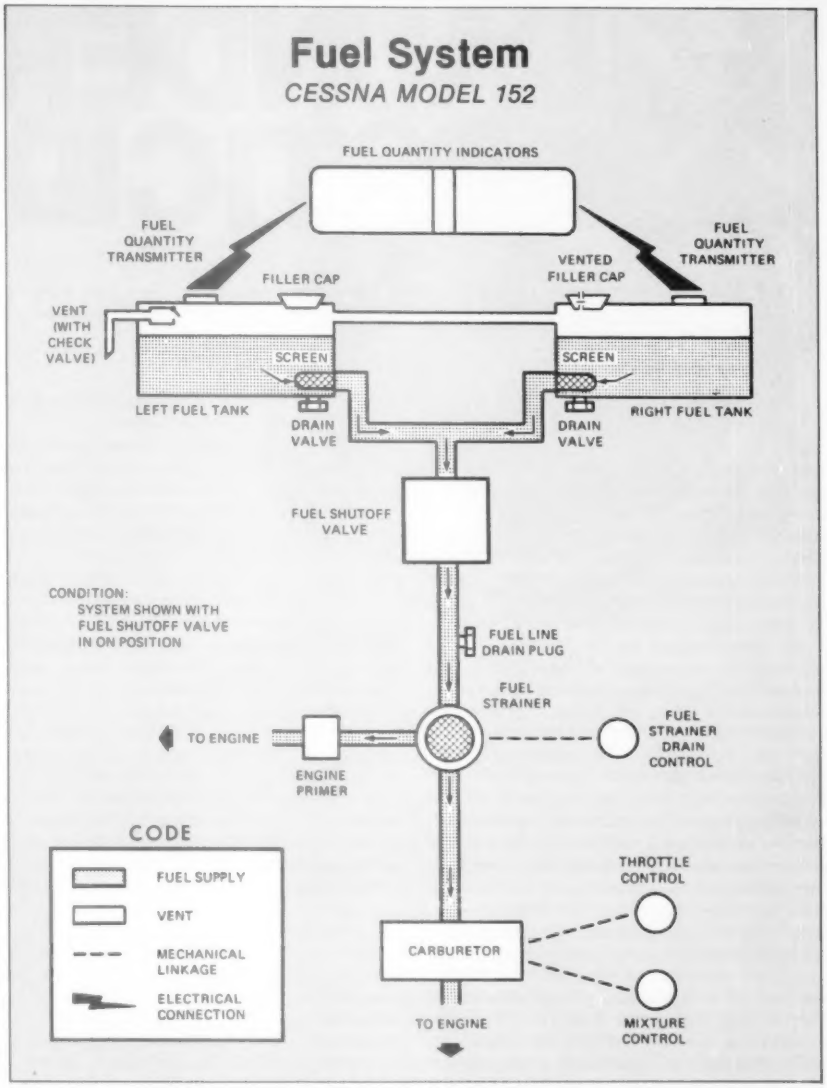
With some aircraft, under certain conditions, it is apparently possible for vent blockage to immobilize all the fuel on board. On January 10, 1980 the pilot of a Cessna *Skylane* made a forced landing on a plowed field after the engine stopped suddenly in flight. The pilot received minor injuries and the airplane was badly damaged but fortunately did not burn. On scene investigation disclosed that the engine was operable, the left tank was empty, and the right tank contained 30 gallons of fuel. The fuel cap for the right tank was vented, in accordance with the airworthiness directive mentioned earlier, but the vent hole was plugged with dirt. Furthermore, the crossover venting tube was found to be kinked sufficiently to prevent airflow. The fuel selector gauge was found in the "BOTH" position; evidently the vacuum condition in the right tank had drawn all the fuel out of the left tank and held it there, causing the engine to fail from fuel starvation.

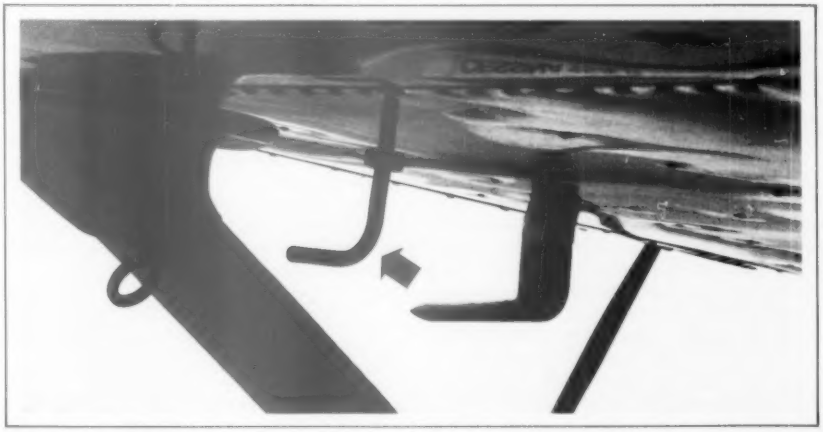
Most of the older owner handbooks, unfortunately, have little or nothing to say about fuel tank vent maintenance, and seldom contain any description of the system. Diagrams are available in many of the recently standardized "Pilot's Operating Handbooks' and these are worthy of study. During the pre-flight examination pilots should be alert for any signs of vent tubing damage or misconfiguration, as well as vent blockage. Qualified mechanics should be consulted if anything appears out of order. Pilots should also make certain that the appropriate fuel caps are in place—some aircraft with two tanks in each wing have vented caps for the outboard tank and non-vented caps inboard, and they must not be transferred during fueling.

Mud daubers, incidentally, are sly enough to place their nests beyond a turn in the vent tubing where they are not easily discoverable. The venting systems of aircraft which have been parked outside and not flown recently should be examined by a mechanic. Forcing compressed air into the tubes to check for clearance or to remove obstacles is NOT recommended and could damage the system (the lines usually have a check valve to prevent fuel spillage.) The vent lines, valves, or even tanks could be ruptured by sufficient pressure.

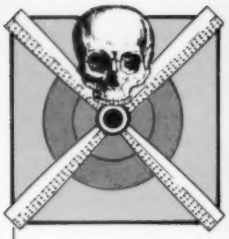
You can do without that kind of venting. ■

Editor's Note: Some of the information and artwork for this article was taken from the "Aviation Safety Digest," Vol. 113/1982, with kind permission of the publisher, Transport Australia.





Cessna 152 fuel vent (arrow) near pitot tube. Vent may be crimped by careless handling.



LAUNDERING PESTICIDES

How ag applicators can avoid wash day woes

Modern technology has done a great deal to protect the aerial applicator from being poisoned by the pesticides he dispenses. From well-sealed cockpits to coveralls, gloves, and goggles, to respirators and air filters, all are designed to keep exposure to pesticides to an absolute minimum for the pilot's health and safety. But in spite of all this sophisticated help, harmful contamination is still possible if one of the most elementary of all protective devices is incorrectly used—the home laundry.

As conscientious as ag pilots are about exposure to the toxins they dispense, mixing and transferring of these chemicals is bound to release dust or fumes into the air. Furthermore, the air in the cockpit is never completely free from pesticide fumes—much more so if open cockpit aircraft are used.

Chemical dust and even the fumes from a liquid preparation are extremely adhesive, so that the pesticide will stick to the crop, but this property also causes it to adhere to the protective clothing pilots wear and to come in contact with their skin. Many ag pilots "shower down" right after the last landing of the day to eliminate this danger. However, pesticide potency is long-lived, and if the clothing is not laundered with special care, residues may accumulate in the clothing and in the laundry equipment, endangering the health of the entire family.

The deadliest of pesticides, organic phosphates such as diazinon, parathion, and malation, contaminate humans by bonding with an enzyme called *cholinesterase*, preventing it from performing its proper function, which is to regulate certain neuro-muscular activities. Without sufficient cholinesterase in the body, seizures will result, along with an extensive paralysis that stops respiration.

Ag pilots are strongly encouraged to have their baseline cholinesterase levels checked periodically to assure that they have not been poisoned by organic phosphates. For those who put it off because of the time it takes or the cost, bear in mine it only takes 24 hours for the phosphate/cholinesterase bond to become permanent and, unless treated promptly, induce a respiratory paralysis which because can be fatal. With prompt medical attention the body will eventually get rid of the inhibited enzyme and make more, but it can be a lengthy process (determined by the extent of the poisoning) and the individual remains highly susceptible to further contamination from even smaller amounts of the pesticide.

Another type of commonly used pesticide, such as baygon, is an organic carbamate. This also bonds with cholinesterase and produces the same type of posioning as phosphates, except that the bonding can be reversed and enzyme levels returned to normal if the pilot remains free of contamination for several days.

Simply tossing the pesticide-contaminated clothing into the washer with a dash of detergent is not sufficient to thoroughly clean the garments. In addition to being adhesive, pesticides are also water-resistant (or the first rainfall would require expensive crop retreatment). Water resistance varies with the pesticide, but it seems that the most highly toxic pesticides are the hardest of all to clean out of clothing.

The Institute of Agricultural and Natural Resources of the University of Nebraska at Lincoln recently studied how to launder chemical-laden clothing effectively and prevent second- or third-party contamination from residues left in washers and dryers. The first recommendation for handlers of pesticides, including ag pilots, is to use *disposable* clothing if at all possible. Realizing this is not always practical, the researchers suggested ways to clean re-usable clothing safely. However, they warn that if clothing has been totally saturated, e.g., from a spill, to discard them, *since no amount of washing would ever completely cleanse them.*

For the University of Nebraska tests, the highly toxic methyl parathion was used on denim, which is the most common material for protective clothing because of its durability. In subsequent tests, the following method was found to work on most types of fabrics and pesticides. **Note:** *Clothing that has been exposed to pesticides should be pre-rinsed and washed separately from uncontaminated family laundry.* Children, because of their smaller body weight and size, are much more susceptible to pesticide poisoning than adults.

Before washing, read the label on the pesticide container for any special cleaning instructions. If there are none, the following procedure is recommended by the Nebraska researchers:

1. **Pre-rinse.** Pre-rinsing with agitation in an automatic washer for two minutes in 120° water was found to be effective in "loosening" the pesticide from the clothing before washing. Soaking in a separate tub or bucket or hosing the clothes down outdoors works well, too, but not as efficiently as the agitator vanes of the washer.

2. **Detergents.** Dry phosphate detergents were found to be most effective for breaking the chemicals loose from the clothing weave when dealing with *dry* chemical residues. A chlorine bleach added to the wash cycle along with the detergent also helped flush more of the pesticide from the clothing. Heavy duty *liquid* phosphate detergents were more effective on oil-based liquid pesticides.

3. **Wash/rinse cycle.** A 12-minutes wash in 140° or hotter water, followed by two rinses in warm (120°) water is the minimum. Repeat as many times as you want, but always with hot water. Put only a few clothes at a time in the washer and use the largest load setting so that there will be more water for flushing the chemicals out. Wash garments contaminated by the same pesticide together. Mixing chemicals can produce unwanted reactions, even with the small quantities involved.

4. **Drying.** The laundered clothes should be *line-dried*; exposure to sunlight actually helps break down what chemical residue may be left into less harmful substances. Machine drying would only transfer that residue to the walls of the dryer and subsequently to uncontaminated clothing.

5. **Washing the washer.** The chemicals that have been flushed out of the clothing will not all drain out with the rinse water (since they are not water-soluble) and may leave a poison film in the washer. Before using the washing machine again for the family wash, clean it by running it through a hot wash, warm rinse cycle several times *without any clothes in it* to make sure the film is cleaned away.

Poisoning by pesticide can be insidious, because the initial symptoms may be indistinguishable from the effects of fatigue, colds, viral infections, etc. The last place you might suspect as the cause of your misery is the dependable family laundry and the first person to suffer from improperly washed flying clothes could be the last person you would want to harm. ■

The First American Monoplane

The breakable but unshakable Henry Walden

At the age of seven, Henry Walden saw his aviation exploits spread across newspaper headlines: "FIRE FROM THE SKY." The incident which caught the attention of the press was actually a huge fire, ignited accidentally when a hot-air balloon came down in a lumber yard. The remarkable fact that a seven-year-old boy had designed, built and flown a "manned" (he used a dummy for a passenger) hot air balloon was somehow lost sight of in the outcry over the menacing flames. But all this was long ago, and far away.

Henry Walden was born, appropriately enough in Walden, MA on November 10, 1883. His father was a successful civil engineer who worked extensively abroad, mainly in Europe. In 1890 he and his family were living in Bucharest, Romania, where a grandiose national state fair was held, featuring manned balloon ascensions.

This led to young Henry's own balloon project, and the consequent fire in the lumberyard. Greatly to Henry's suprise his father took great pride in his accomplishment and settled the lumber damage bill without a word.

Over the next decade, Walden senior knew hard times, and was forced to return home in 1898, leaving his family stranded temporarily in Vienna. Seventeen year-old Henry obtained an apprentice position with an American dentist who was in attendance to Emperor Franz Joseph. Still airminded, Henry was willing to put aside his aviation interests for the moment in pursuit of a trade less dependent than his father's on the fortunes of war and politics. As his mentor explained, there would always be gold in teeth.

In 1906 he graduated from the Columbia School of Dental and Oral-Surgery and set up practice in New York City. Within two years he was solidly established in his profession and debt free.

In September 1908 he joined a newly-formed group of flying enthusiasts known as the Aeronautic Society of New York, which provided members with such things as workshops, tools, sheds—even a race track at Morris Park, which became an air strip for test flights on the outskirts of New York City. A *Curtiss* biplane was demonstrated by Glenn Curtiss himself, who maneuvered a quarter turn of track at an altitude of 25 feet!

By now Henry Walden was convinced that he too could fly and started a design for his own plane, filling teeth hastily between sessions at his drawing board and workshop. Within a year he produced *Walden I*, a biplane that was inexorably earthbound by dint of a huge 500 lb. automobile engine. Henry scrapped the plane and built a larger *Walden II* around the engine. The maiden flight of this colossus was to be a competitive exhibition with Glenn Curtiss, and an enormous crowd gathered on the appointed day, May 21, 1909. The proud designer was spared public humiliation when a sudden storm demolished the plane on the ground.

Now a professional airman (onlookers had paid to gawk at the wreckage), Henry hired an elderly dentist to substitute for him at his office, and gave his full attention to *Walden III*. He had arrived at certain basic principles:

- Biplanes were out (too much "aerodynamic interference")
- Keep it simple
- Keep it light

Walden III had some interesting design characteristics, reflecting Henry's European upbringing. In the first decade of the 20th century the dominating design for powered aircraft was the biplane, as ordained by such pioneering greats as the Wright brothers and Curtiss. But in Europe considerable thought had been given to the advantage of monoplane construction, in combination with engines that provided a much greater power output per lb. of engine weight. In the summer of 1909 the French pioneer Bleriot accomplished the first crossing of the English channel in a monoplane using a small light three cylinder air-cooled Anzani engine producing 22 hp.

Walden managed to purchase an Anzani engine in late 1909 and built his next airplane around it. The craft that emerged from his homebuilt wind tunnel was the first "successful" monoplane built in the United States. In contrast to the Bleriot plane, *Walden III*'s fuselage was an open tubular framework, 26′ long. The pilot was positioned up front, over the tricycle landing gear, where he had unimpeded visibility ahead. The single wing was positioned above and behind the pilot, with the pusher prop also behind. Instead of the manually controllable ailerons, or "wing warpers" of the Wright's patented design, Walden provided an "automatic" wing levelling device. This consisted of a triangular stabilizer, or "ear flap", fixed in place on each wingtip at a 45° angle.

According to Walden, whenever the aircraft banked, the stabilizer at the lower wingtip provided additional lift, while the opposing "ear flap" gave reduced lift, thus inducing the wing to return to horizontal. No moving parts, no lateral controls—very simple.

On December 9, 1909 *Walden III* made its first flight—by accident, according to the designer, who was also making his first appearance in the cockpit. While being ground run at Hempstead Field at Mineola, NY, the monoplane attained "fence post height" for a distance of 300 feet. A safe landing was accomplished, after which the engine blew up for lack of oil. Witnesses were Walden's Romanian mechanic, Radu Tatu, and a cousin, Henry Slater.

For nearly a year afterwards the dentist-airman carried out test flights and demonstrations of *Walden III*, gaining increasing attention from the

(continued on back cover)

HOME OF THE FUTURE? Is this artist's concept of a modest home with attached one-plane hangar a view of the future? There are currently some 40 fly-in, live-in communities across the country where aircraft owners can park close to home, and they seem to be growing in popularity. Taxiways run to subdivisions much like streets do today for car commuters.

PHYSIOLOGICAL TRAINING

Physiological training is again being offered across the country for pilots interested in learning to recognize and overcome vertigo, hypoxia, hyperventilation, etc., during flight. Trainees will be given classroom lectures, a high-altitude "flight" in an altitude chamber, and, at some military bases offering the course, time in a jet cockpit spatial disorientation trainer.

To take the training you must be at least 18 years old, hold a current FAA medical, and not have a cold or any other health problem at the time of the course. The fee is $20.

Application for the training may be made at any FAA general aviation district office. Send the completed application and payment to the Aeronautical Center, General Accounting Branch, AAC-23B, Box 25082, Oklahoma City, OK, 73125. Within 30 to 60 days you will be notified of the time and place of your training. Physiological training will be offered at the following locations:

Aeronautical Center, Oklahoma City, OK
Andrews AFB, MD
Barbers Point NAS, HI
Beale AFB, CA
Brooks, AFB, TX
Brunswick NAS, ME
Cherry Point MCAS, NC
Columbus AFB, MS
Edwards AFB, CA
Ellsworth AFB, SD
El Toro NAS, CA
Fairchild AFB, WA
Jacksonville NAS, FL
Laughlin AFB, TX
Lemoore NAS, CA
Little Rock AFB, AR
MacDill AFB, FL
Mather AFB, CA
NASA-Johnson Space Center, TX
Norfolk NAS, VA
Patuxent River NAS, MD
Pease AFB, NH
Peterson AFB, CO
Point Mugu NMC, CA
Reese AFB, TX
San Diego NAS, CA
Sheppard AFB, TX
Vance AFB, OK
Whidbey Island NAS, WA
Williams AFB, AZ
Wright-Patterson AFB, OH

GAR SYSTEM EASED

Pilots flying on IFR flight plans within the Salt Lake City, Albuquerque, and Seattle air route traffic control centers will no longer need to obtain an advance reservation under the General Aviation Reservation (GAR) system. As of July 19, 1982, the FAR system was discontinued in these three centers, due to increasing ATC capacity.

Elsewhere GAR now requires all general aviation turbojets flying above 29,000', on trips of 200 nautical miles or more, to have a reservation before departing.

FERRYING RULE RELAXED

Part 125 operators of large general aviation aircraft (able to carry 20 or more passengers or of July 12, 1982 ,91.45 allows Part 125 6,000 lbs. and over) will find it easier to ferry operators some aircraft back to base for repair under an to ferry four engine airplanes and three-engine amendment to Federal Aviation Regulation 91.45.

As of July 12, 1982, 91.45 allows Part 125 operators to ferry four engine airplanes and three-engine turbine aircraft back to base with one engine inoperative for the purpose of repair without a special flight permit. Only required flight crewmembers may be carried on the ferry flight, and they must be thoroughly familiar with one-engine out operating procedures.

For further information, consult the June 10, 1982 issue of the *Federal Register* or contact C.W. Schaffer, Aircraft Maintenance Division, AWS-340, FAA, 800 Independence Ave., S.W., Washington, DC, 20591; 202-426-8205.

AVIATION FATALITIES LOW

Of the 53,496 transportation-related deaths in the United States in 1981, only 2.6% were in aviation. According to National Transportation Safety Board figures, there were 1,399 aviation fatalities: 1,265 in general aviation; 130 in commuter and air taxi operations; and four in air carrier.

"ULTRALIGHTS" DEFINED

FAA is giving final consideration to a rule for the operation of flying vehicles in a very lightweight or "ultralight" category. Both powered and unpowered hang gliders would be affected.

Ultralights are being defined according to weight, fuel capacity and certain performance criteria, but would not require an airworthiness certificate or a certificated pilot.

Minimal operating rules would parallel those governing VFR aircraft, and no "foot-launch" capability would be required.

Any questions about the rule should be directed to Gary Perkins, General Aviation Operations Branch, AFO-820, 800 Independence Ave., S.W., Washington, DC, 20591. Telephone (202) 426-8294.

LATEST AIRMEN—PUBLICATIONS

Restricted Cargo

Operators of restricted category aircraft who need clarification of rules concerning carriage of cargo in their aircraft will find it in Advisory Circular 21-17, "Carriage of Cargo in Restricted Category Aircraft and Other Special Purpose Operations." Free from DOT Publications Branch, M-443.1, Washington, DC, 20590.

Noise Abatement

Tips on how VFR general aviation pilots can do their part voluntarily for noise abatement can be found in the updated Advisory Circular 91-36B, "VFR Flight Near Noise-Sensitive Areas." The circular lists procedures for reducing noise problems which pilots can use without altering their flight profiles. Free from DOT Publications Branch, address above.

Proper Parts

An updated listing of approved replacement and modification parts is now available to mechanics, operators or repair stations, or other interested persons. "Part Manufacturer Approvals — 1981" may be purchased from the Superintendent of Documents, Government Printing Office, Washington, DC, 20402 at a cost of $19.00 per copy. Send check or money order and please specify stock number 050-007-00598-9.

SOUTHERN CALIFORNIA FLYING

Southern California instrument pilots should have received a reference chart indicating preferred flight routes and altitudes for flying in approach control airspace in their area. Issued by the FAA regional office, the chart—called SO-CAL for Southern California Terminal Route Program—can be used to reduce pilot/controller workload in one of the nation's busiest areas

California pilots who did not receive a SO-CAL chart, or other pilots who may be interested in receiving one, should contact FAA Western-Pacific Region, Chief, Airspace and Procedures Branch, P.O. Box 92007, Worldway Postal Center, Los Angeles, CA, 90009.

• Aeronca Memories

In the May/June 1982 "Forum" you answered a comment by Don Bennet on the *Aeronca* Model K by describing it as "the low-wing version" of the *Aeronca* C-3. I'm reasonably certain that the Model K I flew in the early 1940's was a high-wing aircraft? Am I losing my memory.

Name Withheld

Indeed not. Our mis-information was the result of a research error. The Model K was a high-wing aircraft, a two-seater with a 37 hp engine. Described by owners as fun to fly, the gas-economical Model K had cleaner, more aerodynamic lines and a longer, more narrow wing than other Aeroncas.

• Throttling Down for Ice

Your article on "Fair Weather Fiends" was most interesting (March/April 1982). I own a 1979 Grumman *Tiger* with a 180 hp Lycoming engine and have found that when closing the throttle, the carburetor air temperature gauge indicates a rise in temperature. I queried a mechanic and was advised that when the engine is shut down the oil returns to a sump located close to the carburetor temperature sensor. The warm oil causes the increase in temperature. Would you agree that if I incur indications of carburetor ice in flight I might be better off closing the throttle, rather than applying carburetor heat or full throttle?

Vincent Iannuzzelli
Newark, NJ

Definately no. The carburetor heat mechanism is provided for a given purpose and should be so used. For proper operations always consult the instructions provided in the pilot's operating handbook or approved flight manual for your aircraft. For additional information, you may consult the engine or aircraft manufacturer for a detailed response.

NOTICE TO NEW SUBSCRIBERS AND RENEWERS

Due to the fluctuation in prices for publications sold by the Government Printing Office, we recommend you contact your nearest GPO Bookstore before you send in your check and order form for *FAA General Aviation News, or other Federal publications.*

There are bookstores in the following locations across the country:

Anchorage, AL (907) 271-5040	Kansas City, MO (816) 374-2160
Atlanta, GA (404) 221-6947	Laurel, MD (301) 953-7974
Birmingham, AL (205) 254-1056	Los Angeles, CA (213) 688-5841
Boston, MA (617) 223-6071	Milwaukee, WI (414) 291-1304
Columbus, OH (614) 469-6956	New York, NY (212) 264-3825
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Dallas, TX (214) 767-0076	Pueblo, CO (303) 544-3142
Denver, CO (303) 837-3964	San Francisco, CA (415) 556-0643
Detroit, MI (313) 226-7816	San Juan, PR (809) 763-4555, x 555
Houston, TX (713) 226-5453	Seattle, WA (206) 442-4270
Jacksonville, FL (904) 791-3801	Washington, DC (202) 275-2091

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

• Potential Hazard of LPG

In your May/June 1982 issue you answered a question from a reader who wanted to know if there is any restriction against carrying propane gas in containers on board an aircraft that is not being used for commercial purposes of any kind.

It is true that there are no restrictions as long as the aircraft is not being used for hire, but all pilots should understand the propane gas, which is regulated as "liquified petroleum gas," does present a potential hazard, in that leaking containers, particularly if the leak is due to pressure differential, could result in a very serious fire or explosion in flight.

For this reason propane gas containers are forbidden on commercially operated, passenger-carrying aircraft, and only authorized carriage on cargo aircraft in compliance with very critical packaging requirements.

James J. Given
Chief, Technical and Cargo
Security Division, ACS 200
Washington, DC

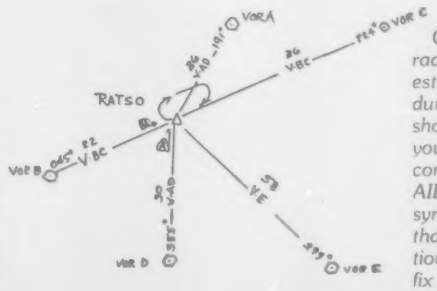
INSTRUMENT CORNER

• Intersection Identification

Could you resolve a question from a number of instructors about the proper procedure for identification of a holding fix? Say the pilot is en route, proceeding from VOR A to VOR B via V-AD, V-BC. South of VOR A he is instructed to hold northeast of RATSO intersection on V-BC.

We all feel that RATSO can be identified by using the 22 mile DME point on VOR "B" 045° radial; or the 30 mile DME point on VOR "D" 355° radial; or the intersection of the VOR "B" radial and the VOR "D" radial. But are these the *only* acceptable means of identifying RATSO for holding purposes?

Martin J. Rielage
Hanover Park, IL



On low altitude en route charts, the radials from NAVAIDs that have been established by FAA flight check procedures to designate an intersection are shown with arrows. (045° and 355° in your hypothetical example) Any other combination of radials from other NAVAIDs are not approved. The "D" shaped symbol originating the arrows indicates that DME may also be used in conjunction with that radial for establishing the fix point.

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(continued from page 13)

Press. On the day of "her death," as Henry referred to the sudden crash of the monoplane after apparently encountering a strong downdraft, newspaper coverage was nation-wide. Walden, who suffered a broken collar bone, injured ankle and three broken ribs, proudly announced that this was the second serious accident in the U.S. aviation history (following the death of Lt. Selfridge in a Wright *Flyer* in 1908).

He proceeded to build, fly and crash a succession of five more models over the next year, culminating in the *Walden IX*. Battered, bruised and nearly bankrupt, Henry obtained a fee of $150 for exhibiting his "All American Monoplane" at Brighton Beach. He was also offered $1,000 for each sustained flight in excess of 15 minutes.

He managed one flight without much difficulty, despite poor quality fuel, but on the second day his carbonized cylinders and lowered power output gave him a 10 foot ceiling at most. He flew so low over the beach, the crowd thought he was deliberately tempting fate, and roared their approval.

Lucrative offers for demonstration flights now poured in from all over the country. Frequent crashes and trips to the hospital continued to occur, but failed to dampen his ardor.

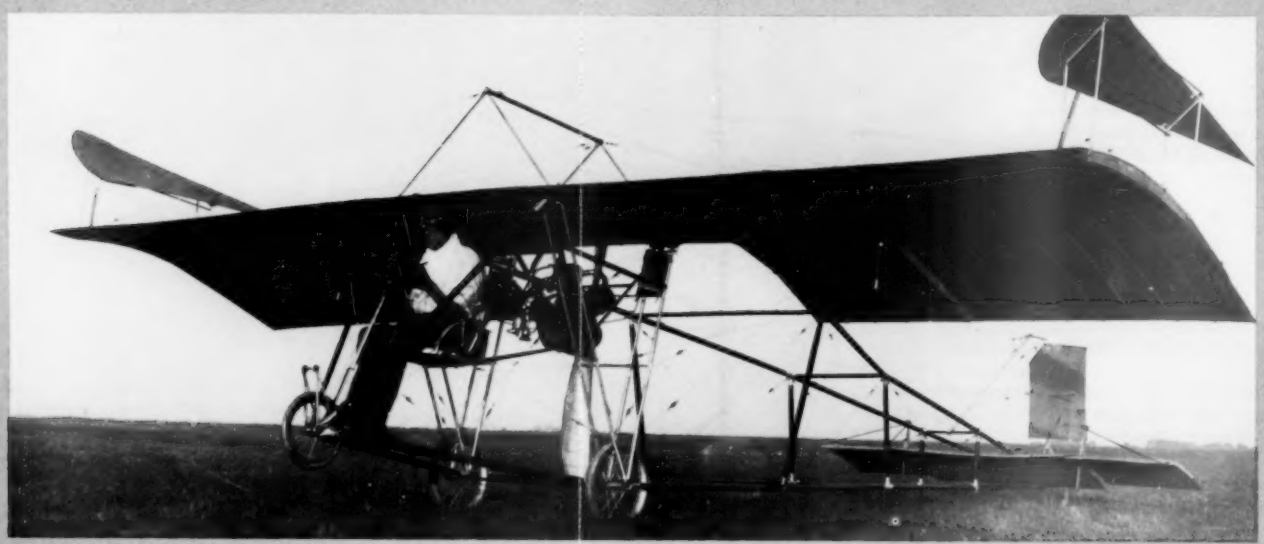
Walden IX was formally registered by the Aero Club of America in 1911 as the "First All-American Monoplane," and its designer formed the Walden Airplane Co. to "..sell airplanes, give demonstration flights and instruction in aeronautics." The dentist claimed many advantages over completing biplanes, including a takeoff roll of only 100 feet and a 147 mph airspeed.

In autumn of 1912 the last of the series, *Walden XII*, was flown at the Maine State Fair at Presque Isle. This model was powered by an American-built Hall-Scott air-cooled engine, producing 40 hp for a maximum speed of over 150 mph. Flown by one of Henry's flight school graduates, the plane thrilled the crowd with a low level highspeed pass and a steep pull-up, then encountered a downdraft over the grandstand, stalled for a delightfully agonizing moment overhead, and plunged to the earth just beyond the spectators. The pilot suffered two broken legs, the plane was demolished. Henry swept up the wreckage under a tent, collected 25 cents a head for onlookers. and paid the hospital bill.

Walden maintained his flying school until 1914 and then phased himself out of the business. His beloved monoplane was a crowd-pleaser everywhere, but it just would not sell—in the popular mind one wing simply was not enough, and this feeling was sustained by his frequent crashes and trips to the hospital. More than a decade would pass before Lindbergh proved once and for all the superiority of the single wing.

In the meantime Walden went back to his dental routines, but as he worked over fillings and repairs his mind continued to play with new ideas. In a laboratory adjoining his office he invented and patented a constant stream of devices, ranging from clothes-patching and coffee-packing machines to a moving electric signboard (for Times Square, N.Y.), 3-D photography and an artificial heart—in addition to numerous aeronautical components and military weapons. He earned and lost several fortunes, but sustained himself steadily through the years by means of his dental practice until his death in 1964, at age 80.

At this time Walden was a forgotten name among the half million American pilots who flew monoplanes but, as Henry had observed on occasion, "It's a good feeling to be right." ■



The **Walden III**, with its distinctive "ear flaps" for lateral control: designer and pilot, Dr. Henry W. Walden.